

REMARKS

Prior to this Response, claims 1-19 were pending in this application. Claims 1, 11, and 18 have been amended in the expectation that the amendments will place the claims in condition for allowance.

The amendments do not introduce new matter within the meaning of 35 U.S.C. §132. Basis for the claim amendments is found in paragraphs [0011], [0012], [0015], [0018], [0039], [0058] and [0059] of the application as published, corresponding to the following passages of the application as filed: page 4, line 8 to page 5, line 21, especially page 4, lines 8-11; page 7, line 14 to page 8, line 2; page 12, line 6 to page 13, line 8; in claims 1-19 as originally filed; and elsewhere throughout the specification and claims. Accordingly, entry of the amendments is respectfully requested.

**1. Rejection of Claim 18 under 35 U.S.C. §112,
second paragraph**

The Office Action rejects claim 18 under 35 U.S.C. §112, second paragraph, for the following reasons:

Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In line 8, "(placed on said teeth)" is unclear as to if the language is being claimed or not because of the use of the parentheses.

Applicants thank the Examiner for calling this informality to their attention. It is Applicants' intent to claim the language found in parentheses, and thus Applicants have amended claim 18 to remove the parentheses.

Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

**2. Rejection of Claims 1-4, 6, 8-12, 14-16 and 18
under 35 U.S.C. §102(e)**

The Office Action rejects claims 1-4, 6, 8-12, 14-16 and 18 under 35 U.S.C. §102(e) as being anticipated by Chapoulaud, et al. (2002/0025503). As the basis for this rejection, the Office Action states:

Chapoulaud shows obtaining a three dimensional virtual representation of teeth, 33 and Fig. 1, with brackets placed on the teeth, Figs. 5E-5G, and from several viewpoints as shown, displays of the teeth with brackets as shown in the screen shots. The screen shots inherently show three dimensional qualities. As to claim 2, the shown viewpoints, top of Figs 5E and 5F, are inherently capable of being a viewpoint from which a bracket can be applied. As to claim 8, see paragraph [0017].

Response

Applicants respectfully traverse this rejection on the basis that (1) Chapoulaud, et al. is not prior art to the present application and (2) Chapoulaud, et al. fail to teach the presently claimed subject matter.

Chapoulaud, et al. was published on February 28, 2002. The present application is a continuation of, and claims priority from, U.S. Patent Application 10/059,728, filed January 29, 2002. Thus, Chapoulaud, et al. is not prior art to the present application under 35 U.S.C. §102(e).

Notwithstanding this defect, Chapoulaud, et al. also fail to teach the presently claimed subject matter. Applicants' claims as presently amended are directed to methods and systems for providing information for correct placement of one or more brackets on corresponding one or more teeth according to a predetermined treatment scheme. The method claims comprise the steps of obtaining a virtual representation of a three-dimensional teeth arrangement of one or both jaws of the individual with brackets placed on said teeth, the position and orientation of the brackets on said teeth, being designed so as to achieve a desired treatment outcome; processing said virtual representation to generate an output data, the output data driving a display to display an image of at least one tooth with a bracket thereon, the displayed image having three-dimensional qualities indicative of said at least one tooth as viewed from a defined viewpoint; and using said displayed image as a guide for proper positioning of said one or more brackets on corresponding said one or more teeth. The system claims add processor modules, displays, data input modules, and/or software for executing the methods steps.

By contrast, Chapoulaud, et al. disclose a system and method by which an orthodontic appliance is automatically designed and manufactured, using three dimensional jigs, based on a digital model of the patients teeth. While the system of Chapoulaud, et al. displays 3D representations of the teeth with brackets placed thereon, these displays are either for general information only, or for enabling the user to interact with the system during the design process to arrive at the final design.

There is no teaching or suggestion whatsoever in Chapoulaud, et al. that the displayed image is, or should be, used as a guide for proper positioning of the brackets on the teeth after the brackets are manufactured and are to be installed on the patient's teeth.

Indeed, Chapoulaud, et al. actually teach away from the present inventive subject matter. Chapoulaud, et al. requires three dimensional jigs be automatically made, according to the system and methods disclosed therein, and are the means used to exactly position the brackets on the teeth, not an image as is used in the inventive methods and systems. Applicants respectfully call the Examiner's attention to the Abstract in Chapoulaud, et al., which is representative of the disclosure therein and states the following:

"A system (10) and method by which an orthodontic appliance (25) is automatically designed and manufactured

from digital lower jaw and tooth shape data of a patient provides for the scanning of the mouth of a patient (12), preferably from a model (20) of the patient's mouth, to produce a three-dimensional digitized model (26) of the shapes of the patient's teeth and their positions in the patient's mouth. Then a computer (30) calculates the post-treatment positions of the teeth and produces three-dimensional images of the teeth, individually and in their calculated positions. An interactive computer link between the doctor's office (11) and the appliance manufacturing facility (13) allows an orthodontist (14) to control the patient's archform and to modify the suggested computer-determined positions and orientations of the teeth in six degrees of freedom, and to experiment with new positions, extractions, over-corrections and other variations, with the computer recalculating the tooth positions with high precision for the approval of the orthodontist. The appliance is automatically designed according to the final design, which also can be interactively modified and approved by the orthodontist, with the computer recalculating the effects on the treatment as a result of the doctor's changes. Brackets (81) are fabricated as an integrated set, either by cutting slots therein or by building the brackets in layers by, for example, stereo lithography. **Three-dimensional custom jigs (87) are automatically made to exactly position the brackets on a patient's teeth.**" (Emphasis added.)

To constitute anticipation under 35 U.S.C. § 102, all material elements of a claim must be found in one prior art source. In re Marshall, 577 F.2d 301, 198 USPQ 344 (CCPA 1978); In re Kalm, 378 F.2d 959, 154 USPQ 10 (CCPA 1967). The disclosure of Chapoulaud, et al., relating to the use of three-dimensional custom jigs for use in bracket positioning, is not tantamount to utilizing displayed images as a guide for bracket positioning. Thus, in the absence of any teaching in Chapoulaud, et al. that a 3D image can

be used for positioning orthodontic brackets, Chapoulaud, et al. do not anticipate the present claims.

Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

3. Rejection of Claims 1, 2, 9, 11 and 12 under 35 U.S.C. §102(b)

The Office Action rejects claims 1, 2, 9, 11 and 12 under 35 U.S.C. §102(b) as being anticipated by Doyle, et al., U.S. Patent No. 5,879,158 (the '158 patent). As the basis for this rejection, the Office Action states:

Doyle shows obtaining a virtual image 14 with brackets 29-31 on a display. The shown viewpoint is inherently a defined viewpoint. The shown drawings, and disclosure of the relative movement of teeth, brackets and arch wires, inherently shows and teaches three dimensional qualities.

Response

Applicants respectfully traverse this rejection on the basis that the '158 patent fails to teach the claimed subject matter. As discussed above and summarized here, Applicants' claims as presently amended are directed to methods and systems for providing information for correct placement of one or more brackets on corresponding one or more teeth according to a predetermined treatment scheme, where a displayed image is used as a guide for proper positioning of bracket(s) on a patient's teeth.

By contrast, the '158 patent discloses a method for installing brackets on teeth based on a digital model of the teeth, and in which jigs are subsequently designed to place the brackets on the teeth. For example, Applicants respectfully call the Examiner's attention to column 11, lines 29-39 in the '158 patent, which is representative of the disclosure therein and states the following: "Each jig is attached to its associated orthodontic bracket and a complete set of jig/bracket combinations is packaged in a multi-cavity shipping tray and forwarded to an orthodontist at step 81. Next, an adhesive is applied to each bracket at step 83 by the orthodontist or may be applied when the jig/bracket combinations are packaged earlier at step 81 in attaching each bracket and buccal tube to its associated jig. **Each jig is then installed on its associated tooth at step 87 using the orthodontic bracket to which the jig is coupled in bonding the brackets and buccal tubes to the teeth.**" (Emphasis added.)

Like Chapoulaud, et al., the '158 patent does not teach or suggest, but rather teaches away from, using a displayed image as a guide for proper positioning of the brackets on the teeth. The '158 patent's disclosure of the use of jig to position the brackets is not tantamount to utilizing displayed images as a guide for bracket positioning. Thus, in the absence of any teaching in the '158 patent that a 3D image can be used for positioning orthodontic

brackets, the '158 patent does not anticipate the present claims.

Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

4. Rejection of Claims 1-19 under 35 U.S.C. §103(a)

The Office Action rejects claims 1-19 under 35 U.S.C. §103(a) as being unpatentable over five different combinations of claims, using a total of ten combinations of references and claims. For convenience, Applicants' responses to these rejections are grouped so that the same claims, rejected under different combinations of references, are treated together.

A. Rejection of claims 7 and 13. Claims 7 and 13 are rejected over (1) Chapoulaud et al (2002/0025503) in view of Hamilton (6413083), (2) Doyle et al (5879158) in view of Hamilton (6413083), and (3) Taub et al (WO 99/16380) in view of Jordan et al (6152731) and further in view of Hamilton (6413083). As the basis for these rejections, the Office Action states the following:

(1) Chapoulaud shows the elements as described above, however, does not show the use of a printer. Hamilton teaches using a printer 108. It would be obvious to one of ordinary skill in the art to modify Chapoulaud to include printing information as is well known and shown and suggested by Hamilton in order to make use of known ways of communicating in the art.

(2) Doyle shows the elements as described above, however, does not show the use of a printer. Hamilton teaches using a printer 108. It would be obvious to one of ordinary skill in the art to modify Doyle to include

printing information as is well known and shown and suggested by Hamilton in order to make use of known ways of communicating in the art.

(3) The above combination shows the elements as described above, however, does not show the use of a printer. Hamilton teaches using a printer 108. It would be obvious to one of ordinary skill in the art to modify the above combination to include printing information as is well known and shown and suggested by Hamilton in order to make use of known ways of communicating in the art.

Response

Applicants respectfully traverse these rejections. To establish a *prima facie* case, the PTO must satisfy three requirements. First, the prior art reference must teach or suggest all the limitations of the claims. *In re Wilson*, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970). Second, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference. *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Third, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1209, 18 U.S.P.Q.2d 1016, 1023 (Fed. Cir. 1991).

As discussed in detail above in the responses to the rejections under §102, neither the cited Chapoulaud, et al.

reference, nor the cited Doyle, et al. reference teach all elements of even the base claims, independent claims 1, 11, and 18, as presently amended. Indeed, as discussed in detail above, Chapoulaud, et al. is not even a proper reference under any circumstance because it was published after the effective filing date of the present application. Clearly, these references also do not teach or suggest the subject matter of the dependent claims, having not taught all the limitations of the base claims, and having thus failed to establish a *prima facie* case.

As a result, any additional reference cited under §103 must first meet the requirement of showing the elements missing from the primary references, and to show in combination all of the limitations of the present claims. The additional cited references, Taub, et al. (WO 99/16380), Jordan, et al. (U.S. Patent No. 6,152,731), and Hamilton (U.S. Patent No. 6,413,083) do not teach or suggest the missing element of utilizing displayed images as a guide for bracket positioning. Thus, in the absence of any teaching in the cited references, alone or in combination, that a 3D image can be used for positioning orthodontic brackets, a *prima facie* case of obviousness can not be established and the claims of the present application are not obvious over any combination of the cited references.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

B. Rejections of claim 19. Claim 19 is rejected over (1) Chapoulaud et al (2002/0025503) in view of Sachdera et al (6350120), (2) Doyle et al (5879158) in view of Sachdera et al (6350120), and (3) Taub et al (WO 99/16380) in view of Jordan et al (6152731), and further in view of Sachdera et al (6350120). As the basis for this rejection, the Office Action states the following:

(1) Chapoulaud shows the elements as described above, however, does not show the use of a database of virtual brackets. Sachdera teaches using a library of virtual brackets, column 6, lines 25-31. It would be obvious to one of ordinary skill in the art to modify Chapoulaud to include using a database of virtual brackets as shown by Sachdera in order to better simulate the brackets intended to be placed on the teeth.

(2) Doyle shows the elements as described above, however, does not show the use of a database of virtual brackets. Sachdera teaches using a library of virtual brackets, column 6, lines 25-31. It would be obvious to one of ordinary skill in the art to modify Doyle to include using a database of virtual brackets as shown by Sachdera in order to better simulate the brackets intended to be placed on the teeth.

(3) The above combination shows the elements as described above, however, does not show the use of a database of virtual brackets. Sachdera teaches using a library of virtual brackets, column 6, lines 25-31. It would be obvious to one of ordinary skill in the art to modify the above combination to include using a database of virtual brackets as shown by Sachdera in order to better simulate the brackets intended to be placed on the teeth.

Applicants respectfully traverse these rejections. As discussed in detail immediately above, none of the cited

Chapoulaud, et al., Doyle, et al., Taub, et al., Jordan, et al., and Hamilton references, alone or in combination, teach all elements of any of the claims, as presently amended. Again, as discussed in detail above, Chapoulaud, et al. is not even a proper reference.

The additional references cited in this rejection under §103 must initially meet the requirement of showing the elements missing from the primary references, and to show in combination all of the limitations of the present claims. The additional cited reference in this rejection, Sachdera, et al, (U.S. Patent No. 6,350,120) does not teach or suggest the missing element of utilizing displayed images as a guide for bracket positioning. Thus, in the absence of any teaching in the cited references, alone or in combination, that a 3D image can be used for positioning orthodontic brackets, a *prima facie* case of obviousness can not be established and the claims of the present application are not obvious over any combination of the cited references.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

C. Rejection of claims 2-4, 6, 14-16 and 18. Claims 2-4, 6, 14-16 and 18 are rejected over Doyle et al (5879158). As the basis for this rejection, the Office Action states the following:

There are many viewpoints that are capable of functioning as a viewpoint from which a bracket may be applied, and

as such, the shown viewpoints of Doyle can obviously be viewpoints from which a bracket may be applied. As to claim 3, Doyle shows several viewpoints, Figs. 1 and 2. As to claim 4, Doyle shows displaying sets of teeth as shown in the drawings.

Response

Applicants respectfully traverse this rejection. For the reasons discussed in detail above, Doyle, et al. do not teach or suggest the claimed element of utilizing displayed images as a guide for bracket positioning. Thus, in the absence of any teaching in the cited reference that a 3D image can be used for positioning orthodontic brackets, a *prima facie* case of obviousness can not be established and the claims of the present application are not obvious over Doyle, et al.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

D. Rejection of claims 8 and 10. Claims 8 and 10 are rejected over (1) Doyle et al (5879158) in view of Chishti et al (6227850) and (2) Taub et al (WO 99/16380) in view of Jordan et al (6152731), and further in view of Chishti et al (6227850). As the basis for this rejection, the Office Action states the following:

(1) Doyle teaches the elements as described above, however, does not show transmitting data to a remote location. Chishti teaches using a remote location, column 14, lines 35-45. It would be obvious to one of ordinary skill in the art to modify Doyle to include using a remote location as shown by Chishti in order to more conveniently provide orthodontic planning.

(2) The above combination teaches the elements as described above, however, does not show transmitting data to a remote location. Chishti teaches using a remote location, column 14, lines 35-45. It would be obvious to one of ordinary skill in the art to modify the above combination to include using a remote location as shown by Chishti in order to more conveniently provide orthodontic planning.

Response

Applicants respectfully traverse these rejections. Again, as discussed in detail above, the cited Doyle, et al., Taub, et al., and Jordan, et al. references, alone or in combination, do not teach all elements of any of the claims, as presently amended.

The additional reference cited in this rejection under \$103, Chishti, et al. (U.S. Patent No. 6,227,850), fails to meet the initial requirement of showing the elements missing from the primary references, and to show in combination all of the limitations of the present claims. Chishti, et al., do not teach or suggest the missing element of utilizing displayed images as a guide for bracket positioning. Thus, in the absence of any teaching in the cited references, alone or in combination, that a 3D image can be used for positioning orthodontic brackets, a *prima facie* case of obviousness can not be established and the claims of the present application are not obvious over any combination of the cited references.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

E. Rejection of claims 1-6, 9, 11, 12 and 14-18. Claims 1-6, 9, 11, 12 and 14-18 are rejected over Taub et al (WO 99/16380) in view of Jordan et al (6152731). As the basis for this rejection, the Office Action states the following:

Taub shows a virtual image of teeth, at least one having a bracket thereon, Fig. 4B. Taub does not show displaying in three dimensions. Jordan teaches displaying in three dimensions, column 8, lines 50-53. It would be obvious to one of ordinary skill in the art to modify Taub to include displaying in three dimensions in order to better view the teeth and orthodontic elements. To use different viewpoints is an obvious matter of choice in views used to one of ordinary skill in the art. To use different sets of teeth is an obvious matter of choice in the teeth it is desired to work on to the skilled artisan. As to claim 5, Taub is used to help place brackets, to display in order of bracket placement would be obvious to one of ordinary skill in the art.

Response

Applicants respectfully traverse this rejection. For the reasons discussed in detail above, Taub, et al. and Jordan, et al. do not teach or suggest the claimed element of utilizing displayed images as a guide for bracket positioning. Thus, in the absence of any teaching in the cited reference that a 3D image can be used for positioning orthodontic brackets, a *prima facie* case of obviousness can not be established and the claims of the present application are not obvious over Taub, et al. and Jordan, et al., alone or in combination.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

5. Objections to the Drawings

The Office Action objects to the drawings for the following reasons:

The drawings filed January 29, 2002 is objected to by the examiner because the copies of the photographs are dark and features cannot be discerned and there is unblocked text, see Fig. 7B.

Applicants thank the Examiner for his comments regarding the drawings filed January 29, 2002. Applicants will file formal drawings in this matter upon receipt of an indication of allowable subject matter.

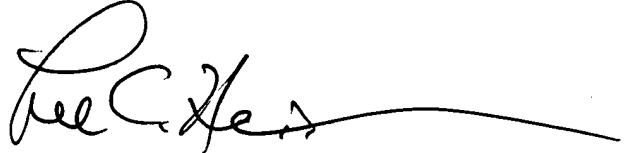
CONCLUSION

Based upon the above remarks, the presently claimed subject matter is believed to be novel and patentably distinguishable over the prior art of record. The Examiner is therefore respectfully requested to reconsider and withdraw the rejections of remaining claims 1-19 and allow all pending claims presented herein for reconsideration. Favorable action with an early allowance of the claims pending in this application is earnestly solicited.

The Examiner is welcomed to telephone the undersigned attorney if he has any questions or comments.

Respectfully submitted,

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